

SECTION 3

PLANNING FRAMEWORK AND PROJECT JUSTIFICATION



Snapper Mineral Sands Project Environmental Assessment

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3 PLANNING FRAMEWORK AND SNAPPER MINE JUSTIFICATION

This section outlines the statutory provisions relevant to the assessment of the Snapper Mine and provides a project justification (i.e. the need for the Snapper Mine when considered against the principles of ecologically sustainable development [ESD]).

The Project Application would be assessed in accordance with the framework established by the EP&A Act and the EP&A Regulation.

3.1 MAJOR PROJECTS

The EP&A Act and the EP&A Regulation provide a framework for environmental planning and assessment in NSW. Part 3A of the EP&A Act provides an approval process that is particularly adapted for major projects.

Section 75B(1) of the EP&A Act defines development to which Part 3A applies:

This Part applies to the carrying out of development that is declared under this section to be a project to which this Part applies:

- (a) *by a State environmental planning policy, or*
- (b) *by order of the Minister published in the Gazette including by an order that amends such a policy.*

Schedule 1 of the State Environmental Planning Policy (SEPP) (Major Projects) 2005 (Major Projects SEPP) identifies developments which are major projects. The Snapper Mine is considered a project to which Part 3A of the EP&A Act applies under Schedule 1, Group 2 of the Major Projects SEPP:

Group 2 Mining, petroleum production, extractive industries and related industries

5 Mining

- (1) *Development for the purpose of mining that:*
 - (a) *is coal or mineral sands mining...*

On 3 August 2006, the Director-General of the DoP, under delegation from the Minister for Planning (the Minister), formed the opinion that the Snapper Mine met the requirements of the Major Projects SEPP (clause 6) and declared the Snapper Mine to be a major project under Part 3A of the EP&A Act. In accordance with section 75D(1) of the EP&A Act, the Minister is the Approval Authority for the Snapper Mine.

3.1.1 Application of other Provisions of the EP&A Act

Section 75R of the EP&A Act outlines the applicability of other provisions of the EP&A Act under Part 3A:

- Parts 4 and 5 of the EP&A Act do not, except as provided by Part 3A, apply to or in respect of an approved Part 3A project.
- Part 3 of the EP&A Act and SEPPs apply to the declaration and the carrying out of a Part 3A project.
- Non-SEPP environmental planning instruments (e.g. Local Environmental Plans [LEPs] and Regional Environmental Plans [REPs]) do not apply to or in respect of an approved Part 3A project. Non-SEPP environmental planning instruments may apply (subject to their wording being relevant and applicable) to the consideration by the Minister of an application for approval under Part 3A and to the approval by the Minister of a Part 3A project (section 75J(3) provides that a [non-critical infrastructure] Part 3A project must not be such that it would have been wholly prohibited had Part 4 applied).
- Divisions 6 (Contributions) and 6A (Affordable Housing Contributions) of Part 4 apply to a Part 3A project.

3.1.2 Other Approvals

Approvals and Legislation that do not Apply to Approved Part 3A Projects

Section 75U of the EP&A Act outlines the authorisations that do not apply to approved Part 3A projects:

- Part 3 of the *Coastal Protection Act, 1979*;
- Sections 201, 205 and 219 of the *Fisheries Management Act, 1994*;

- Division 8 of Part 6, Part 4 and Section 139 of the *Heritage Act, 1977*;
- Sections 87 and 90 of the *National Parks and Wildlife Act, 1974*;
- Section 12 of the *Native Vegetation Act, 2003*;
- Part 3A of the *Rivers and Foreshores Improvement Act, 1948*;
- Section 100B of the *Rural Fires Act, 1997*; and
- Sections 89, 90 and 91 of the *Water Management Act, 2000*.

Approvals and Legislation that must be Applied Consistently

Section 75V of the EP&A Act outlines the authorisations that cannot be refused if they are necessary for the carrying out of a project approved under Part 3A and which must be substantially consistent with the Part 3A approval:

- Section 144 of the *Fisheries Management Act, 1994*;
- Section 15 of the *Mine Subsidence Compensation Act, 1961*;
- mining lease under the *Mining Act, 1992*;
- production lease under the *Petroleum (Onshore) Act, 1991*;
- Chapter 3 of the POEO Act; and
- Section 138 of the *Roads Act, 1993*.

3.2 PERMISSIBLE DEVELOPMENT

The Snapper Mine area is situated wholly within Zone 1(a) (General Rural Zone) within the Wentworth local government area (LGA).

Although the Snapper Mine is subject to assessment under Part 3A of the EP&A Act, the terms of the Wentworth LEP remain relevant considerations. If Part 4 of the EP&A Act applied, the Snapper Mine would be permissible on lands zoned Zone 1(a) (General Rural Zone) with Development Consent. It is therefore not prohibited or “wholly prohibited” within the meaning of section 75J(3).

3.3 ENVIRONMENTAL PLANNING INSTRUMENTS

3.3.1 Wentworth LEP

Although Part 4 of the EP&A Act does not apply and the Wentworth LEP refers to “Council” as the consent authority which is not applicable for a Part 3A project, the clauses of the Wentworth LEP may be relevant considerations for the Minister in assessing the Snapper Mine under Part 3A of the EP&A Act.

Part 2, clause 9 of the Wentworth LEP provides:

Except as otherwise provided by this plan, the council must not grant consent to the carrying out of development on land to which this plan applies unless the council is of the opinion that the carrying out of the development is consistent with the objectives of the zone within which the development is proposed to be carried out.

The Snapper Mine is located within Zone 1(a) (General Rural Zone) within the Wentworth LGA. The objectives of this zone include “protecting, enhancing and conserving” agricultural land, soil stability, forests, valuable deposits of minerals, vegetation on sensitive lands, water resources and areas of significance for nature conservation.

However, the combined operation of Clause 9 and the objectives Clause of the 1(a) zone is negated by SEPP 45 (Permissibility of Mining) (SEPP 45). Specifically, Clause 5(2) of SEPP 45 states:

... if mining is permissible on land with development consent in accordance with an environmental planning instrument if the consent authority is satisfied as to certain matters specified in the instrument, mining is permissible on that land with development consent without the consent authority having to be satisfied as to those specified matters.

Part 3 Special Provisions

Part 3 of the Wentworth LEP provides a number of miscellaneous provisions of relevance to the Snapper Mine including the following:

- **12 General considerations for development within rural zones**

- (1) *The Council must not consent to an application to carry out development on land within Zone No 1 (a), 1 (c) or 1 (d) unless it has taken into consideration, if relevant, the effect of the carrying out of that development on:*
 - (a) *the present use of the land, the potential use of the land for the purposes of agriculture and the potential of any land which is prime crop and pasture land for sustained agricultural production,*
 - (b) *vegetation, timber production, land capability (including soil resources and soil stability) and water resources (including the quality and stability of water courses and ground water storage, salinity and riparian rights),*
 - (c) *the future recovery from known or prospective areas of valuable deposits of minerals, coal, petroleum, sand, gravel or other extractive materials,*
 - (d) *the protection of areas of significance for nature conservation or of high scenic or recreational value and places and buildings of archaeological or heritage significance, including Aboriginal relics and places,*
 - (e) *the cost of providing, extending and maintaining public amenities and services to the development,*
 - (f) *future expansion of settlements in the locality, and*
 - (g) *the effect of the development on the behaviour of floodwater, including the cumulative effects of that development and the pollution threat to any river from the development.*
- (2) *As well as the matters referred to in subclause (1), the Council shall take into consideration the relationship of the development to development on adjoining land and on other land in the locality.*

Section 4 provides an environmental assessment of the potential impacts of the Snapper Mine including land resources, ecology (flora and fauna), surface water, groundwater, cultural heritage and socio-economics. Section 4 also addresses potential impacts on the rural land of the Snapper Mine area and adjoining land where relevant. This EA also includes a description of the existing environment, an assessment of potential impacts and description of the proposed environmental mitigation and management measures.

Accordingly, the Minister can be satisfied as to these matters.

- **15 Conflicting land uses**

When determining a development application, the Council shall consider the creation of buffer areas between potentially conflicting land uses.

Section 4 addresses potential impacts on adjoining land where relevant.

A Noise Management Plan (NMP) (Section 4.11.3) and an Air Quality Management Plan (AQMP) (Section 4.12.3) would be developed for the Snapper Mine. The NMP and AQMP would provide a process to validate the predicted noise and air quality impacts of the Snapper Mine. The NMP and AQMP would also include procedures for the application of contingency measures, if necessary.

A SWMP would be developed and the existing *Ginkgo Mineral Sands Project Borefield Impact Management Plan* (Ginkgo Mine BIMP) (BEMAX, 2006a) would be revised for the Snapper Mine (Sections 4.4.3 and 4.5.3). Collectively, the SWMP and revised BIMP would include a site water balance, on-site water management measures (including erosion and sediment control measures) and a groundwater monitoring programme. The revised BIMP would include procedures that would be implemented to ameliorate potential groundwater impacts on surrounding land, where applicable. These documents would also include procedures for the application of contingency measures, if necessary.

This EA includes environmental mitigation measures to be implemented during the design, construction and operation of the Snapper Mine to minimise potential impacts on adjoining land.

Accordingly, the Minister can be satisfied as to these matters.

• **28 Land subject to bushfire hazard**

The Council must not grant consent to the subdivision of, or to the erection of a building on, land which is subject to bushfire hazards by reason of the vegetation on the land or on any adjacent land unless, in the opinion of the Council:

- (a) *adequate provision is made for access for fire fighting vehicles,*
- (b) *adequate safeguards are adopted in the form of fire breaks, reserves and fire radiation zones, and*
- (c) *adequate water supplies are available for fire fighting purposes.*

An assessment of potential bushfire hazard impacts of the Snapper Mine is provided in Section 4.2.2.

An Emergency Response Plan (ERP) would be formulated to detail responsibilities in the event of emergencies in and around the Snapper Mine area. Snapper Mine fire response would be co-ordinated with the local bushfire brigade.

In addition to environmental responsibilities, there exists significant economic incentive to prevent fire damage to the considerable investment in mining infrastructure and equipment. Where applicable, controlled burning to reduce fuel loads within the Snapper Mine lands would be undertaken in consultation with the DNR and landholders.

Accordingly, the Minister can be satisfied as to these matters.

The following provisions of Part 3 of the Wentworth LEP are considered relevant to cultural heritage within the Snapper Mine area.

• **29 Heritage items**

- (1) *A person must not, in respect of a building, work, relic, tree or place that is a heritage item:*
 - (a) *demolish or alter the building or work,*
 - (b) *damage or move the relic,*
 - (c) *excavate for the purpose of exposing the relic,*
 - (d) *damage or despoil the place or tree,*
 - (e) *erect a building on or subdivide land on which the building, work or relic is situated or that comprises the place, or*

- (f) *damage any tree on land on which the building, work or relic is situated or on the land which comprises the place,*

except with the consent of the Council.

- (2) *The Council must not grant consent to a development application required by subclause (1) unless it has taken into consideration the extent to which the carrying out of the proposed development would affect the heritage significance of the item and any stylistic or horticultural features of its setting.*

• **30 Protection of Aboriginal and archaeologically sensitive sites**

- (1) *The Council shall maintain a register for planning purposes of Aboriginal relic sites and places notified or declared under Part 6 of the National Parks and Wildlife Act 1974, and a list of locations and landscape elements where there is a high likelihood of Aboriginal relic sites occurring, as may be supplied to it from time to time by the National Parks and Wildlife Service.*
- (2) *The Council shall advise the National Parks and Wildlife Service of any application for consent to development which has the potential to disturb sites on lands registered or listed in accordance with subclause (1).*
- (3) *The Council shall allow 28 days from the dispatch of any advice under subclause (2), for receipt from the Service of any advice concerning Aboriginal relic sites or places, before granting consent to the development application.*

• **31 Development in the vicinity of heritage items**

The Council must not grant consent to an application to carry out development on land in the vicinity of a heritage item unless it has made an assessment of the effect the carrying out of that development will have on the heritage significance of the item and its setting.

- **33 Development of a place of potential historical archaeological significance**

Where the consent authority receives an application to carry out development on land which comprises a potential historical archaeological site, the consent authority must not grant consent to the application unless:

- (a) *it has received from the applicant and considered a conservation plan which includes an assessment of how the proposed development would affect the conservation of the site, and*
- (b) *in the case of development involving the disturbance or excavation of the land, any excavation permit required under the Heritage Act 1977 has been obtained.*

The Cultural Heritage Assessment (Appendix B) identified 22 Aboriginal cultural heritage sites and one historical cultural heritage (i.e. non-Aboriginal) site within the Snapper Mine area. Of those identified, 19 sites would be directly disturbed. The NSW Department of Environment and Conservation (DEC) has been notified of the locations of Aboriginal objects found at the Snapper Mine site during the Cultural Heritage Assessment. The DEC would be notified of any additional Aboriginal cultural heritage objects identified at the Snapper Mine site during construction and operation.

Impact mitigation and environmental management measures regarding cultural heritage for the Snapper Mine are presented in Sections 4.6 and 4.7.

Accordingly, the Minister can be satisfied as to the above cultural heritage matters.

- **35 Access**

A person, other than the Council, must not construct a road which has access to a public road or a Crown road except with the consent of the Council.

The existing HAR from the Ginkgo Mine to the Silver City Highway would be extended by approximately 1 km into the northern extent of the mine site and by approximately 6 km to the eastern side of the mine site (Figure 1-2). Internal access roads and maintenance tracks along the ETL would also be developed.

BEMAX has consulted with the RTA, the BHCC and the WSC in regard to road developments for the Snapper Mine (Section 3.7.1). In addition, a Road Transport Assessment (Appendix C) has been undertaken and concluded the Snapper Mine would not create significant adverse traffic impacts on the surrounding roads (including the Silver City Highway) either during construction or operation, and the Snapper Mine is considered acceptable from a road transport perspective.

Accordingly, the Minister can be satisfied as to these matters.

3.3.2 Section 94 Contribution Plans and Development Control Plans

There are no Section 94 Contribution Plans or Development Control Plans currently in force that are relevant to the Snapper Mine.

3.3.3 Western Division Regional Environmental Plan No 1—Extractive Industries

The *Western Division Regional Environmental Plan No 1—Extractive Industries* (Western Division REP No. 1) applies to all land within the Western Division Region of NSW. The aims of this plan include the facilitation, and control in an orderly manner, of the extraction of geological materials (other than minerals) from the lands of the Western Division Region of NSW. Since the Snapper Mine would be extracting minerals, the Western Division REP No. 1 does not apply to the Snapper Mine.

3.3.4 SEPPs

The following SEPPs are relevant to the Snapper Mine:

Major Projects SEPP

Clause 2 of the Major Projects SEPP outlines a number of aims, the following of which are relevant to the Snapper Mine:

- (a) *to identify development to which the development assessment and approval process under Part 3A of the Act applies,*
...

- (c) *to facilitate the development, redevelopment or protection of important urban, coastal and regional sites of economic, environmental or social significance to the State so as to facilitate the orderly use, development or conservation of those State significant sites for the benefit of the State, ...*
- (e) *to rationalise and clarify the provisions making the Minister the approval authority for development and sites of State significance, and to keep those provisions under review so that the approval process is devolved to councils when State planning objectives have been achieved.*

As outlined in Section 3.1, on 3 August 2006 the Director-General of the DoP, under delegation from the Minister, formed the opinion that the Snapper Mine met the requirements of the Major Projects SEPP and declared the Snapper Mine to be a major project under Part 3A of the EP&A Act.

SEPP No. 11 (Traffic Generating Developments) (SEPP 11)

SEPP 11 requires the Approval Authority to refer a copy of the Project Application and accompanying EA to the RTA for it to make a representation in relation to the development.

BEMAX has consulted with the RTA in regard to road developments for the Snapper Mine (Section 3.7.1). In addition, a Road Transport Assessment (Appendix C) has been undertaken.

SEPP No. 33 (Hazardous and Offensive Development) (SEPP 33)

For development of potentially hazardous industry, Clause 12 of SEPP 33 requires a Preliminary Hazard Analysis (PHA) to be prepared. Clause 13 of SEPP 33 requires the Approval Authority, in considering a Project Approval for a potentially hazardous or a potentially offensive industry, to consider:

- (a) *current circulars or guidelines published by the Department of Planning relating to hazardous or offensive development, and*
- (b) *whether any public authority should be consulted concerning any environmental and land use safety requirements with which the development should comply, and*

- (c) *in the case of development for the purpose of a potentially hazardous industry – a preliminary hazard analysis prepared by or on behalf of the applicant, and*
- (d) *any feasible alternatives to the carrying out of the development and the reasons for choosing the development the subject of the application (including any feasible alternatives for the location of the development and the reasons for choosing the location the subject of the application), and*
- (e) *any likely future use of the land surrounding the development.*

As part of the preparation of this EA, a PHA has been conducted (Appendix K). The PHA has been prepared in accordance with the general principles of risk evaluation and assessment outlined in the NSW Department of Urban Affairs and Planning (DUAP) *Multi-Level Risk Assessment* (1999). In addition, the PHA considers the qualitative criteria provided in *Risk Criteria for Land Use Safety Planning: Hazardous Industry Planning Advisory Paper No. 4* (DUAP, 1992a) and is documented in general accordance with *Guidelines for Hazard Analysis: Hazardous Industry Planning Advisory Paper No. 6* (DUAP, 1992b).

Extensive consultation has been undertaken with public authorities during the preparation of this EA as detailed in Section 3.7.1. Alternatives to the Snapper Mine are discussed in Section 3.9.2.

SEPP No. 44 (Koala Habitat Protection) (SEPP 44)

SEPP 44 requires the council in certain LGAs (including Wentworth Shire) to consider whether the land which is to be the subject of the Development Consent is "*potential koala habitat*" or "*core koala habitat*" (Appendix D). SEPP 44 refers to "council" throughout. The Snapper Mine is a major project for which the Approval Authority is the Minister. References to "council" (when referring to giving consent) in SEPP 44 would therefore be interpreted as references to the Minister for the Snapper Mine.

An assessment of Koala habitat is provided in Appendix D. This assessment concluded that the lands in the Snapper Mine area do not fall within the definition of potential or core Koala habitat and there was no evidence of the presence of Koalas. Therefore, the provisions of SEPP 44 are not considered applicable to the Snapper Mine.

SEPP 45

SEPP 45 is described in Section 3.3.1.

SEPP No. 55 (Remediation of Land) (SEPP 55)

SEPP 55 aims to provide a State-wide planning approach to the remediation of contaminated land. Under SEPP 55, planning authorities are required to consider the potential for contamination to adversely affect the suitability of the site.

Under Clause 7(1), a consent authority must consider the following:

- (a) *whether the land is contaminated, and*
- (b) *if the land is contaminated, it is satisfied that the land is suitable in its contaminated state (or will be suitable, after remediation) for the purpose for which the development is proposed to be carried out, and*
- (c) *if the land requires remediation to be made suitable for the purpose for which the development is proposed to be carried out, it is satisfied that the land will be remediated before the land is used for that purpose.*

Further, under Clause 7(2), before determining an application for consent to carry out development that would involve a change of use of land, the consent authority must consider a report specifying the findings of a preliminary investigation of the land concerned carried out in accordance with the contaminated land planning guidelines.

Because there is a change in use from agricultural activities to mining, a preliminary land contamination investigation has been undertaken (BEMAX, 2007). The investigation was undertaken in accordance with the *Managing Land Contamination: Planning Guidelines SEPP 55 - Remediation of Land* (DUAP, 1998). The Snapper Mine area is considered suitable for a landuse change from agriculture to the development of the Snapper Mine (BEMAX, 2007).

3.4 OTHER RELEVANT STATUTORY PROVISIONS

The following Acts may be applicable to the Snapper Mine:

- *Dangerous Goods Act, 1975;*
- *Noxious Weeds Act, 1993;*
- *Mining Act, 1992;*
- *RC Act;*
- *Road and Rail Transport (Dangerous Goods) Act, 1997;*
- *Roads Act, 1993;*
- *POEO Act;*
- *Threatened Species Conservation Act, 1995 (TSC Act);*
- *Water Act, 1912; and*
- *Water Management Act, 2000.*

Relevant licences or approvals required under these Acts would be obtained as required. For example, the site would require a mining lease under the *Mining Act, 1992* (Section 3.4.1), an Environment Protection Licence (EPL) under the POEO Act and water licences under the *Water Act, 1912* and *Water Management Act, 2000* for groundwater extraction.

The Commonwealth *Environment and Protection and Biodiversity Conservation Act, 1999* (EPBC Act) may also be applicable to the Snapper Mine as described in Section 3.5.

3.4.1 Mining Act, 1992

Under the *Mining Act, 1992*, environmental protection and rehabilitation are regulated by conditions included in all mining leases, including requirements for the submission of a Mining Operations Plan (MOP) prior to the commencement of operation, and subsequent Annual Environmental Management Reports (AEMR).

Collectively, the MOP and AEMR constitute the *Guidelines to the Mining, Rehabilitation and Environmental Management Process* (MREMP) (NSW Department of Primary Industries-Mineral Resources [DPI-MR], 2006) which has been developed by DPI-MR.

The MREMP is a framework that aims to facilitate the development of mining in NSW in a safe manner such that operations are safe, the environment is protected, the resources are efficiently extracted and rehabilitation achieves a stable, satisfactory outcome (*ibid.*). The structure and content of the Snapper Mine MOP and AEMR would be developed in accordance with the MREMP guidelines (DPI-MR, 2006) and through consultation with various regulatory and advisory agencies including DPI-MR, DEC, DoP and WSC.

As Snapper Mine rehabilitation and regeneration activities would be undertaken progressively, the MREMP would be used throughout the mine life to both plan and track the performance of these activities as they are carried out.

MOP

The MOP would provide information in regard to the mining, processing and rehabilitation operations, relevant lease and development conditions, licences and other approvals. The MOP would also describe:

- area(s) to be disturbed;
- mining and rehabilitation method(s) to be used and their sequence;
- existing surface infrastructure;
- progressive rehabilitation schedules;
- areas of particular environmental sensitivity;
- land and water management systems; and
- resource recovery.

The MOP would be revised periodically as well as prior to any significant alteration to the mining and rehabilitation operations.

AEMR

An AEMR would be prepared to address the status of approvals, leases, licences and environmental risk management and control strategies.

For the preceding 12 month period, the AEMR would provide a summary of community relations and liaison, mine development and rehabilitation in relation to the MOP. Snapper Mine environmental performance in relation to the collective conditions of approvals, leases and licences for the previous 12 month period would also be reported.

The AEMR would also include a review and any proposed improvements in relation to environmental monitoring and management systems and environmental performance and would specify environmental and rehabilitation targets to be achieved during the ensuing 12 month period.

3.5 EPBC ACT

The EPBC Act commenced operation on 16 July 2000. The EPBC Act defines proposals that are likely to have an impact on a matter of environmental significance as a “controlled action”. Proposals that are, or may be, a controlled action are required to be referred to the Commonwealth Minister for the Environment and Heritage for a determination as to whether or not the action is a controlled action.

The Snapper Mine would be referred to the Commonwealth Minister for the Environment and Heritage for an assessment of whether or not it includes a controlled action under the EPBC Act.

Consultation with the Commonwealth Department for Environment and Heritage (DEH) has been undertaken as part of the preparation of the EA and is summarised in Section 3.7.1.

3.6 INTERACTION WITH OTHER BEMAX ACTIVITIES

Development of the Snapper Mine would involve interaction with a number of other BEMAX activities (i.e. the Ginkgo Mine and the MSP) that do not form part of this Project Application. The interaction of the Snapper Mine with these other activities is described below.

Although both the Ginkgo and Snapper Mines would be economically viable as stand-alone operations (BEMAX, 2003), BEMAX’s Murray Basin operations¹ (which currently incorporate the Ginkgo Mine and the MSP) would benefit from both mines operating in conjunction (i.e. development of the Snapper Mine would allow BEMAX to recoup significant infrastructure costs incurred during the development of the Ginkgo Mine in 2005).

¹ These operations have also been referred to as the “Pooncarie Project” in BEMAX announcements to the Australian Stock Exchange.

The Snapper Mine has been designed to integrate with Ginkgo Mine ancillary infrastructure and facilities as far as practicable. For example, major ancillary infrastructure for the Snapper Mine comprises extensions/sharing of the existing Ginkgo Mine ETL, HAR and expansion of the Ginkgo Mine accommodation camp to accommodate Snapper Mine workers (Figure 1-2). Further, the schedule for the Snapper Mine complements the schedule for the Ginkgo Mine (i.e. operation at the Snapper Mine would increase when ore grades at the Ginkgo Mine start to decline).

The planning framework implications of the Ginkgo Mine and the MSP are described below.

3.6.1 The Ginkgo Mine

From a planning framework perspective, interaction between the Snapper Mine and the Ginkgo Mine would not trigger a requirement to modify the Ginkgo Mine Development Consent.

3.6.2 The MSP

Interaction between the Snapper Mine and the MSP (including changes to the processing rate, fuel requirements, emissions and amount of mineral product railed from the MSP) would trigger a requirement to modify the MSP Development Consent. An application under Section 96(2) of the EP&A Act is proposed to seek approval for changes triggered by the development of the Snapper Mine.

3.7 ENVIRONMENTAL ASSESSMENT CONSULTATION

BEMAX is committed to an open and constructive consultation programme, which aims to:

- inform government and public stakeholders of the nature and status of its regional operations;
- present information to stakeholders to facilitate a clear understanding of its regional operations;
- identify issues of concern to stakeholders for consideration in this EA; and
- establish dialogue between BEMAX and government and community stakeholders that would be on-going, should the Snapper Mine be approved.

The level of consultation undertaken is considered to be in accordance with the DGRs (Section 1.3) and is appropriate for the preparation of an EA under Part 3A of the EP&A Act. Consultation has been undertaken with members of the public, state government agencies and local councils.

The consultation programme has provided an effective avenue to identify issues of concern or interest to stakeholders and to address these issues in this EA document where applicable.

The consultation undertaken to date is summarised in the following sub-sections and includes a synopsis of the relevant issues raised. It is anticipated that consultation would continue to be undertaken with government and non-government stakeholders during the assessment of this EA and construction and operation of the Snapper Mine.

3.7.1 Government Agencies

State and Local Government

Consultation with relevant NSW government agencies commenced mid 2003. This consultation was in the form of government briefings in regard to the particulars of the Snapper Mine for the purpose of commencing the Project Approval process and was followed by the PFM. The PFM was attended by representatives of the following agencies/bodies:

- DoP;
- NSW Environment Protection Authority (EPA) (now incorporated within the DEC);
- NSW National Parks and Wildlife Service (NPWS) (now incorporated within the DEC);
- NSW Department of Mineral Resources (now DPI-MR);
- NSW Agriculture (now DPI-Agriculture); and
- NSW Department of Land and Water Conservation (DLWC) (now DNR).

During 2006, a range of state government agencies/authorities and local councils were consulted to discuss issues with respect to the environmental assessment of the Snapper Mine under the Part 3A assessment and approvals regime. A summary of this consultation is presented below.

DoP

Discussions were held with the DoP in regard to the interaction of the Snapper Mine with other activities/approvals (i.e. the Ginkgo Mine and the MSP), the EA approval process, assessment requirements and planning considerations, and issues that arose during consultation with other government stakeholders.

DEC

A meeting was held with the DEC in September 2006 to discuss particular aspects of the assessment. Comments and input were received from the DEC. The issues raised and the relevant section of the EA where each issue is addressed is provided below:

- Assessment of potential impacts on flora and fauna (Sections 4.9.2 and 4.10.2 and Appendices D and E).
- Comprehensive Snapper Mine offset strategy (Section 4.9.3 and Appendix E).
- MSP Process Waste Material Assessment methodology (Appendix I).
- Noise Assessment methodology (Appendix F).
- Air Quality Assessment methodology (Appendix G).
- Cultural Heritage Assessment methodology (Appendix B).

A follow-up meeting was held with the DEC in December 2006 to discuss progress and findings relevant to flora and fauna compensatory measures. Comments and input received during this meeting were considered in this EA document.

DNR

A meeting was held with the DNR in October 2006 to discuss the Snapper Mine. Comments and input were received from the DNR. The issues raised and the relevant section of the EA where each issue is addressed is provided below:

- Hydrogeological Assessment methodology (Appendix A).
- Detailed modelling of potential surface water impacts (note: the DNR advised that modelling would not be required if surface water features are unlikely to be impacted) (Section 4.5.2).
- Assessment of potential impacts on flora (Section 4.9.2 and Appendix E).

- Comprehensive Snapper Mine offset strategy (Section 4.9.3 and Appendix E).
- Rehabilitation (Section 5).

Follow-up meetings were held with the DNR in November and December 2006 to discuss progress and preliminary findings relevant to the abovementioned issues. Comments and input received during these meetings were considered in this EA document.

DPI-MR

Representatives of the DPI-MR attended the PFM in 2003. In addition, the DPI-MR was provided the Project Application and Preliminary Assessment in July 2006. The DPI-MR provided correspondence to the DoP in response to the Project Application and the Preliminary Assessment. The issues raised by the DPI-MR in this correspondence and the relevant section of the EA where each issue is addressed is provided below:

- Rehabilitation (Section 5).
- Tailings (i.e. sand residue) management (Section 2.4.6 and Appendix H).
- Groundwater, surface water, fauna, flora, noise, air quality and radiation monitoring (Section 4 and Appendices A, D, E, F, G and I).
- Greenhouse gas emissions (Sections 4.12.2 and 4.12.3 and Appendix G).

WSC

A meeting was held with the WSC in September 2006 to discuss the Snapper Mine. Comments and input were received from the WSC. The issues raised and the relevant section of the EA where each issue is addressed is provided below:

- Cultural Heritage Assessment methodology and feedback (Section 3.7.2 and Appendix B).
- Road Transport Assessment methodology (Appendix C).
- Socio-Economic Assessment methodology (Appendix J).
- Water and electricity supply (Sections 2.7.2, 2.8.2 and 3.9.2).

Consultation was also undertaken with WSC representatives during the preparation of the Socio-Economic Assessment (Appendix J) to identify any concerns regarding the potential population effects of the development and associated potential impacts on employment, housing and community infrastructure.

Consultation was also undertaken with WSC representatives during the preparation of the Cultural Heritage Assessment (Appendix B) to identify WSC-listed cultural heritage sites.

During the preparation of the Road Transport Assessment (Appendix C), WSC provided relevant traffic count data.

BHCC

Representatives of the BHCC were invited to the PFM held in August 2003.

A meeting was held with the BHCC in September 2006 to discuss the Snapper Mine. Comments and input were received from the BHCC. The issues raised and the relevant section of the EA where each issue is addressed is provided below:

- Process Waste Materials Assessment methodology (Appendix I).
- Road Transport Assessment methodology (Appendix C).
- Socio-Economic Assessment methodology (Appendix J).

Consultation was also undertaken with BHCC representatives during the preparation of the Socio-Economic Assessment (Appendix J) to identify any concerns regarding the potential population effects of the development and associated potential impacts on employment, housing and community infrastructure.

During the preparation of the Road Transport Assessment (Appendix C), BHCC provided relevant traffic count data.

RTA

Several meetings were held with the RTA during the preparation of the EA. In particular, the consultation focussed on the RTA's requirements in regard to the potential use of vehicles larger than double road trains (e.g. AB-triple vehicles). Consultation would continue to be undertaken with the RTA during the assessment of this EA.

During the preparation of the Road Transport Assessment (Appendix C), the RTA provided relevant traffic accident data.

Commonwealth Government Agencies

DEH

The Snapper Mine would be referred to the Commonwealth Minister for the Environment and Heritage for a determination of whether or not it includes a controlled action under the EPBC Act (Section 3.5).

The DEH was contacted to discuss the Snapper Mine during the preparation of the EA. The DEH advised that the bilateral agreement between the Commonwealth and the State of NSW may apply.

3.7.2 Public Consultation

Public Consultation

BEMAX has been engaged in consultation with the local community since the initiation of the Ginkgo Mine exploration programme in 1998. With respect to the Ginkgo Mine, BEMAX has developed a formal on-going programme of public consultation with all stakeholders. This programme commenced in July 2001. Further, BEMAX has implemented the *Ginkgo Mineral Sands Project Community Consultation Plan* (Ginkgo Mine CCP) (BEMAX, 2004a), in accordance with Ginkgo Mine Development Consent Condition 10.1. The Ginkgo Mine CCP (*ibid.*) outlines the mechanisms for on-going consultation with local residents, regarding the Ginkgo Mine.

At the MSP, consultation with local landholders commenced in September 2001. Further, in accordance with MSP Development Consent Condition 5.3, BEMAX has established a Community Consultation Program to liaise with the community (for the life of the MSP) on matters affecting the local community and the environmental performance of the MSP. The MSP Community Consultation Program involves:

- regular (at least annually) public meetings during which the environmental performance of the MSP is discussed;
- public newsletters issued every six months which report on environmental management at the MSP;

- publication of a formal procedure for the MSP to receive public comment and/or complaints; and
- occasional representation by the DoP, DEC, DNR and BHCC, to discuss issues related to the areas of regulation, operation or interest.

Informal consultation with the local community regarding the Snapper Mine commenced with the initiation of the exploration programme in 1999. Communication with directly-affected landholders was conducted during the preparation of the EA.

Aboriginal Groups

Consultation with the Aboriginal community included interested individuals as well as the following groups:

- the Barkindji Elders Committee (BEC); and
- the Webster Family.

The proposed methodology for the cultural and archaeological assessment was provided to the above Aboriginal groups and individuals for their review and feedback. A BEMAX representative and the specialist archaeologist also attended a meeting called by the BEC on 11 October 2006 to discuss the Snapper Mine and the proposed cultural and archaeological survey and assessment.

Representatives of the Aboriginal groups accompanied the specialist archaeologist during the field survey conducted in October 2006 as part of the Cultural Heritage Assessment presented in Appendix B.

A draft of the Cultural Heritage Assessment report was made available to the Aboriginal groups and individuals for comment prior to finalisation of the EA. The draft report included the findings of the surveys and proposed Snapper Mine cultural heritage management measures. Individuals who had been provided the draft report were contacted to obtain their comments on the draft report.

Relevant issues arising during the Cultural Heritage Assessment and associated consultation included:

- discussion on various survey methods and strategies;
- Aboriginal cultural heritage values;
- heritage management measures;

- the role of Aboriginal people according to their relationship to the Snapper Mine area;
- description of the Snapper Mine mining and rehabilitation process;
- survey of areas outside of the immediate Snapper Mine disturbance area;
- development of and participation in the implementation of a Snapper Mine Aboriginal Cultural Heritage Management Plan (ACHMP);
- conservation outcomes with respect to Aboriginal cultural heritage; and
- opportunities for the employment of Aboriginal people.

Relevant issues raised by Aboriginal stakeholders were considered in the Cultural Heritage Assessment (Appendix B), including development of the management measures described in Appendix B and Section 4.6.

Further detail on the Aboriginal community consultation programme conducted for the EA is provided in Section 4.6 and Appendix B.

Other Public Consultation

BEMAX has a website that provides general information on the company, existing projects and contact details. The website can be found at www.bemax.com.au. The website presents company announcements, including those relevant to the Snapper Mine.

Consultation has also been undertaken in other forms during preparation of this EA, including contact with directly-affected landholders to discuss the Snapper Mine, the EA preparation and process, and the environmental performance of the Ginkgo Mine.

3.7.3 Service Providers

A range of service providers have been consulted with respect to the services likely to be required for the Snapper Mine. This included consultation with providers of electricity, health, education, real estate and regional development services.

3.8 GENERAL OVERVIEW OF ENVIRONMENTAL IMPACTS

In accordance with the DGRs (Section 1.3), a General Overview was undertaken to identify key issues for the construction and operation of the Snapper Mine. This included a review of the scope of the EA studies to confirm that the key issues would be assessed. The key issues raised during consultation (outlined in Section 3.7) were considered during the preparation of the General Overview. The General Overview was conducted on 19 October 2006 and consisted of representatives from BEMAX and Resource Strategies.

The key environmental issues that were identified in the General Overview and the sections of this EA that address these issues are presented in Table 3-1. The General Overview is provided in Appendix L.

3.9 SNAPPER MINE JUSTIFICATION

In accordance with the requirements of the DGRs (Section 1.3), the need for the Snapper Mine and alternatives considered are provided below. This section also provides a description of the consideration and application of the principles of ESD to the Snapper Mine.

A summary conclusion justifying the Snapper Mine, taking into consideration the suitability of the site, potential benefits and potential environmental impacts of the development is also provided, as required by the DGRs.

3.9.1 Need for the Snapper Mine

Whilst mineral sand production in Australia from existing mines will decline over coming years due to depletion of mining reserves in Western Australia, new mines in the Murray Darling Basin and associated production facilities have the opportunity to fill this shortfall in supply.

The Murray Darling Basin has a number of advantages over projects awaiting development in both other parts of Australia and in other countries, including low political and sovereign risk and a sophisticated mining environment with well-developed infrastructure.

Table 3-1
Key Potential Environmental Issues Identified in the General Overview of Environmental Impacts

Issue	Document Reference
Loss of vegetation and fauna habitat from surface disturbance.	Sections 4.9 and 4.10 and Appendices D and E
Potential impacts from transport, handling and disposal of backloaded MSP process waste.	Sections 4.2 and 4.8 and Appendix I
Potential impacts from dust and noise generation.	Sections 4.11 and 4.12 and Appendices F and G
Potential impacts to groundwater including: - potential mounding from water disposal dam; and - potential impacts on surface features.	Sections 4.4 and 4.5 and Appendix A
Indirect impacts on vegetation and fauna habitat including: - potential seepage (from sources such as dams and slurried overburden emplacements) impacting on vegetation; and - potential discharge from groundwater mounding.	Sections 4.4 and Appendices A, D and E
Rehabilitation accounting for saline material.	Section 5 and Appendix H
Potential groundwater impacts on surrounding stock water users.	Section 4.4 and Appendix A
Potential impacts on regional community infrastructure.	Section 4.14 and Appendix J
Potential impacts associated with increased traffic levels.	Section 4.8 and Appendix C
Regional economic impacts.	Section 4.13 and Appendix J
Potential impacts on Aboriginal heritage sites.	Section 4.6 and Appendix B
Potential impacts to flora and fauna resulting from changed hydrogeological conditions within land reserved as national park or historic site or dedicated as nature reserve or declared as wilderness under the <i>National Parks and Wildlife Act, 1974</i> .	Appendices A, D and E

Source: Appendix L

Export Demand and Supply of Mineral Sands

The Snapper Mine would produce ilmenite-rich, leucoxene-rich and non-magnetic [rutile-rich and zircon-rich] concentrates for further separation at the MSP to produce ilmenite, leucoxene, rutile and zircon products.

Ilmenite, leucoxene and rutile are sources of titanium dioxide. Demand for titanium dioxide is driven by the pigment, plastic, printing, inks, food colourings, fabric delustering agents, sunscreens, cosmetics, and paper industries. Rutile is used to make titanium metal used for aircraft component manufacture, golf clubs, sports equipment, surgical implants and water desalination plants. In addition to existing demand, new technology for production of titanium metal is being developed which is likely to increase it.

Zircon is a key raw material used in the production of pacifiers, floor tiles, sanitary ware, glass and steel refractories, metal castings, specialised glass as well as faceplates for television monitors and computer screens.

Australia is the world's largest supplier to the global titanium feedstock industry and is also the leading supplier of zircon to the ceramics, refractory and foundry industries. The demand for mineral sand products has been recently forecast to grow over the next five years (BEMAX, 2006e). The current outlook for demand is better than it has been for a number of years, due mainly to the very rapid and continuing industrialisation of China (*ibid.*). With the majority of global pigment producers running at capacity, the Snapper Mine would contribute to servicing this demand.

The Role of the Snapper Mine

The Socio-Economic Assessment presented in Appendix J indicates that the development of the Snapper Mine would potentially have significant economic benefits to the region and the NSW and Australian economies.

The Snapper Mine would provide an average of approximately 200 and up to approximately 250 direct full-time construction jobs for a period of some 15 months during initial construction and would provide approximately 110 operational jobs.

Employment and expenditure associated with the Snapper Mine is also predicted to have significant flow-on effects in the regional economy.

The Socio-Economic Assessment (Appendix J) indicates that, on average, construction of the Snapper Mine is likely to lead to the creation of up to 250 direct and indirect jobs in the regional economy. Similarly, the operation of the Snapper Mine is predicted to generate some 140 direct and indirect jobs in the regional economy.

3.9.2 Consideration of Alternatives to the Snapper Mine

The Snapper Mine location is determined by the mineral sand resource and the location of EL 5474 and EL 6024. In addition, the Snapper Mine site has access to electricity (given the nearby location of the Ginkgo Mine ETL and power supply), main roads and other general services.

Given the above, the location of the Snapper Mine is not considered further in this section.

The Snapper Mine has been designed to integrate with Ginkgo Mine ancillary infrastructure and facilities as far as practicable. For example, major ancillary infrastructure for the Snapper Mine comprises extensions/sharing of the existing Ginkgo Mine ETL, HAR and expansion of the Ginkgo Mine accommodation camp to accommodate Snapper Mine workers. Also, the mine production schedule for the Snapper Mine complements the schedule for the Ginkgo Mine (i.e. operation at the Snapper Mine would increase when ore grades at the Ginkgo Mine start to decline). Potential alternatives which were considered included (but were not limited to) production rate and scale, mining method, transport of mineral concentrate, water supply, and power supply, however these alternatives were not economically optimal when considering capital requirements and efficient use of existing measures.

BEMAX has considered the alternative of not proceeding with the Snapper Mine. Were the Snapper Mine not to proceed, the following consequences are inferred:

- a peak of up to approximately 250 direct construction and up to approximately 110 direct operational phase employment opportunities, and associated flow-on effects, would not be created;
- the NPV of \$144M would not be realised;
- tax revenue from the Snapper Mine would not be generated; and
- royalties to the State of NSW would not be generated.

Production Rate and Scale

The scale of a mining project is determined by the optimum recovery of the resource and production rate that maximises profitability and on-going viability whilst enabling compliance with statutory conditions and guidelines.

BEMAX has undertaken an analysis of the resource, mineral market and optimal dredge and flotation plant throughput to determine the optimum scale and production rate for the Snapper Mine.

Consideration of the capital cost of developing the Snapper Mine, associated infrastructure and on-going expenses, such as mineral concentrate transportation costs, resulted in the selection of a schedule of approximately 8.2 Mtpa of ore. The provisional life of mine production schedule is provided in Section 2.4.1. The schedule for the Snapper Mine complements the schedule for the Ginkgo Mine (i.e. operation at the Snapper Mine would increase when ore grades at the Ginkgo Mine start to decline). The schedule shows the combined development of the Snapper and Ginkgo Mines and maximum annual production of approximately 650,000 tpa of mineral concentrate. The maximum rate of production from the Snapper Mine alone would be approximately 450,000 tpa.

From an environmental perspective, there are no significant advantages to operating at a significantly smaller or larger mine throughput than that described above, as only the time period of the Snapper Mine changes and not the overall potential environmental (and socio-economic) impacts associated with the Snapper Mine.

Mining Method

There are two mining methods commonly associated with mineral sands mining:

- dry mining with conventional mining equipment including dozers, scrapers, front end loaders and haul trucks, etc.; or
- dredge (wet) mining where groundwater levels and hydrology are conducive to the formation of a dredge pond within the orebody.

Of these, dredge mining is generally the most efficient and cost effective option, as dredging and primary concentration of the heavy minerals can be combined into a single operation within the dredge pond and barren sands (i.e. sand residues) can be efficiently returned to the dredge pond behind the working area. The Snapper Mine deposit is suited to dredge mining due to the physical characteristics of the orebody and overburden material, the location of the orebody with respect to the standing groundwater table and the presence of suitable groundwater resources.

Dredge mining would therefore be the primary method of mining and would involve the same method of mining as the Ginkgo Mine (i.e. conventional mineral sands dredge mining). Secondary mining of ore would occur simultaneous to dredge mining as required, and would be undertaken by conventional mobile equipment (i.e. dozers and/or scrapers) depositing ore in front of the dredge.

Transport of Mineral Concentrate

As stated, transport of mineral concentrate from the Ginkgo Mine site to the MSP is currently undertaken by a haulage contractor operating a fleet of 55 t payload double road trains. The haulage fleet and mineral concentrate transport route would be shared to truck mineral concentrate from the Ginkgo and Snapper Mines to the MSP. Either double road trains or other appropriate RTA-approved haulage vehicles (e.g. AB-triple vehicles) would be used to transport mineral concentrate from the Snapper and Ginkgo Mines to the MSP. BEMAX have an “in principle” agreement with the RTA to use AB-triple vehicles.

Road upgrades (e.g. road intersections) undertaken by BEMAX along the mineral concentrate transport route (which includes the HAR) between the Ginkgo Mine and MSP have been designed to a standard appropriate for Class 12 triple road trains (although the use of vehicles larger than double road trains [e.g. AB-triple vehicles] would be subject to further consultation with the RTA, WSC and BHCC). The HAR would be extended by approximately 1 km into the northern extent of the mine site and by approximately 6 km to the eastern side of the mine site (Figure 1-2).

Given the above, the mode of transport of mineral concentrate from the Snapper Mine is not considered further in this section.

Water Supply

Identifying supply alternatives for potable and mine process water supply included an assessment of groundwater and surface water sources. A saline groundwater aquifer exists within the Snapper Mine area and extends west to the Great Darling Anabranch, east to the Darling River and south to the Murray River. The salinity of this aquifer is comparable to sea water and it is not suitable for potable or agricultural uses. Water from this aquifer would need to be passed through a RO plant prior to use as potable water.

No significant drainage lines exist within the immediate vicinity of the Snapper Mine that could provide a source of make-up water from surface water sources.

As described in Appendix A, a groundwater investigation and modelling programme was undertaken to investigate the nature and extent of groundwater aquifers and the potential of the saline aquifer to supply make-up and potable water to the Snapper Mine. The groundwater investigations indicate that the aquifer would be capable of supplying the volumes required by the Snapper Mine (Appendix A).

Power Supply

As stated in Section 2.2.2, the existing ETL to the Gingko Mine would be extended by approximately 10 km to provide the power requirements of the Snapper Mine (Figure 1-2). An electricity distribution station would be located at the Snapper Mine site (Figure 2-2). Power would then be reticulated around the site at 22 kV. Each operating area would then have a re-locatable step-down substation located adjacent to the working area.

Given the relatively close proximity of the ETL at the Ginkgo Mine, it would not be economically viable to construct an electricity generation plant at the Snapper Mine.

3.9.3 ESD Considerations

Background

The concept of sustainable development came to prominence at the World Commission on Environment and Development 1987, in the report entitled *Our Common Future*, which defined sustainable development as:

Development that meets the needs of the present without compromising the ability of future generations to meet their own needs.

In recognition of the importance of sustainable development, the Commonwealth Government (Commonwealth of Australia, 1992) developed a *National Strategy for Ecologically Sustainable Development, 1992* (NSED) that defines ESD as:

using, conserving and enhancing the community's resources so that ecological processes, on which life depends, are maintained, and the total quality of life, now and in the future, can be increased.

The NSED was developed with the following core objectives:

- enhance individual and community well-being and welfare by following a path of economic development that safeguards the welfare of future generations;
- provide for inter-generational and intra-generational equity; and
- protect biological diversity and maintain essential processes and life support systems.

In addition, the NSED contains the following goal:

Development that improves the total quality of life, both now and in the future, in a way that maintains the ecological processes on which life depends.

In accordance with the core objectives and a view to the achieving this goal, the NSED presents private enterprise in Australia with the following role:

Private enterprise in Australia has a critical role to play in supporting the concept of ESD while taking decisions and actions which are aimed at helping to achieve the goal of this Strategy.

Australia's commitment to the principles of ESD is considered in the EPBC Act, which defines principles of ESD:

- (a) *decision-making processes should effectively integrate both long-term and short-term economic, environmental, social and equitable considerations;*
- (b) *if there are threats of serious or irreversible environmental damage, lack of full scientific certainty should not be used as a reason for postponing measures to prevent environmental degradation;*

- (c) *the principle of inter-generational equity – that the present generation should ensure that the health, diversity and productivity of the environment is maintained or enhanced for the benefit of future generations;*
- (d) *the conservation of biological diversity and ecological integrity should be a fundamental consideration in decision-making;*
- (e) *improved valuation, pricing and incentive mechanisms should be promoted.*

For the purposes of this EA, the relevant definition of ESD is that in section 6(2) of the *Protection of the Environment Administration Act, 1991*, which is the definition adopted by the EP&A Act. This definition provides as follows:

Ecologically sustainable development requires the effective integration of economic and environmental considerations in decision-making processes. Ecologically sustainable development can be achieved through the implementation of the following principles and programs:

- (a) *the precautionary principle – namely, that if there are threats of serious or irreversible environmental damage, lack of full scientific certainty should not be used as a reason for postponing measures to prevent environmental degradation.*

In the application of the precautionary principle, public and private decisions should be guided by:

- (i) *careful evaluation to avoid, wherever practicable, serious or irreversible damage to the environment, and*
- (ii) *an assessment of the risk-weighted consequences of various options.*
- (b) *inter-generational equity – namely, that the present generation should ensure that the health, diversity and productivity of the environment are maintained or enhanced for the benefit of future generations,*
- (c) *conservation of biological diversity and ecological integrity – namely, that conservation of biological diversity and ecological integrity should be a fundamental consideration,*

- (d) *improved valuation, pricing and incentive mechanisms – namely, that environmental factors should be included in the valuation of assets and services, such as:*

- (i) *polluter pays – that is, those who generate pollution and waste should bear the cost of containment, avoidance or abatement,*
- (ii) *the users of goods and services should pay prices based on the full life cycle of costs of providing goods and services, including the use of natural resources and assets and the ultimate disposal of any waste,*
- (iii) *environmental goals, having been established, should be pursued in the most cost effective way, by establishing incentive structures, including market mechanisms, that enable those best placed to maximise benefits or minimise costs to develop their own solutions and responses to environmental problems.*

ESD Assessment

The Snapper Mine design, planning and assessment have been carried out applying the principles of ESD, through:

- incorporation of risk assessment and analysis at various stages in the Snapper Mine design and environmental assessment and within decision-making processes;
- adoption of high standards for environmental and occupational health and safety performance;
- consultation with regulatory and community stakeholders; and
- optimisation of the economic benefits to the community arising from the development of the Snapper Mine.

An assessment of potential long-term impacts of the Snapper Mine was carried out during the preparation of this EA on aspects of water management, cultural heritage, road transport, ecology (flora and fauna), noise emissions, air quality emissions (including greenhouse emissions), rehabilitation, process waste management, socio-economics, land resources and visual amenity.

The Snapper Mine design takes into account biophysical considerations, including the principles of ESD as defined in section 6(2) of the *Protection of the Environment Administration Act, 1991*. In addition, it can be demonstrated that the Snapper Mine can be operated in accordance with ESD principles through the application of mitigation and management measures to minimise environmental impacts during the construction and operation of the Snapper Mine.

The following subsections describe the consideration and application of the principles of ESD to the Snapper Mine.

Precautionary Principle

Environmental assessment involves predicting what the environmental outcomes of a development are likely to be. The precautionary principle reinforces the need to take risk and uncertainty into account, especially in relation to threats of irreversible environmental damage.

A PHA (Appendix K), General Overview (Appendix L), Process Waste Materials Risk Assessment (Appendix I) and Saline Slurried Overburden Risk Assessment (Appendix H) were conducted to identify risks and potential environmental impacts and develop appropriate mitigation measures and strategies. The PHA considers off-site risks to people, property and the environment (in the presence of controls) arising from atypical and abnormal hazardous events and conditions (i.e. equipment failure, operator error and external events). The PHA does not consider those risks that are not atypical, or abnormal (e.g. long-term effects of dust emissions on adjacent vegetation). The General Overview identifies potential environmental impacts associated with the Snapper Mine, including long-term effects. The Process Waste Materials Risk Assessment identifies risks associated with the handling and disposal of waste (including backloaded MSP process waste) at the Snapper Mine. The Saline Slurried Overburden Risk Assessment identifies and assesses risks to the success of rehabilitation and revegetation of the Snapper Mine site associated with the use of saline slurry in the overburden emplacements.

Longer-term expected risks are considered by the specialist studies conducted in support of this EA (Section 1.4). Findings of these specialist assessments are presented in Section 4 and relevant appendices along with measures designed to mitigate potential environmental impacts arising from the Snapper Mine.

The PHA (Appendix K), General Overview (Appendix L), Process Waste Materials Risk Assessment (Appendix I) and Saline Slurried Overburden Risk Assessment (Appendix H) have evaluated the potential for harm to the environment associated with development of the Snapper Mine and have identified measures that can be implemented to minimise harm where practicable.

This has also been undertaken with consideration for potential harm arising from potential cumulative impacts from the Snapper and Ginkgo Mines. An extensive range of measures have been adopted as components of the Snapper Mine design to minimise the potential for serious and/or irreversible damage to the environment, including the development of environmental management and monitoring measures and an offset strategy that would be implemented (Section 4). Where residual risks are identified, contingency controls have been considered.

Social Equity

Social equity is defined by inter-generational and intra-generational equity. Inter-generational equity is the concept that the present generation should ensure that the health, diversity and productivity of the environment is maintained or enhanced for the benefit of future generations, while intra-generational equity is applied within the same generation.

The principles of social equity are addressed through:

- assessment of the social impacts of the proposal, including the distribution of impacts between stakeholders (Appendix J);
- consideration of greenhouse gases generated by the Snapper Mine are estimated to be, on average, approximately 0.098 Mt of carbon dioxide equivalent per annum (CO₂-e pa) for both construction and operation phases (both direct and indirect emission factors were used to provide a conservative estimate of greenhouse gas emissions from the Snapper Mine [Appendix G]);
- management measures to be implemented in relation to the potential impacts of the Snapper Mine during construction and operation on air quality, noise, ecology (flora and fauna), surface water, groundwater, hazardous waste, heritage, land resources, road transport, visual amenity and socio-economics;

- implementation of environmental management and monitoring measures (Section 4) to minimise potential environmental impacts (which include environmental management and monitoring programmes covering the Snapper Mine life); and
- implementation of an offset strategy during the life of the Snapper Mine to offset for potential ecological impacts that have been identified.

In particular, the Snapper Mine would benefit current and future generations through the generation and maintenance of employment (employment of up to approximately 250 people during the construction phase and approximately 110 people during the operation phase). Flow-on employment effects, particularly during the operation phase, are also predicted (Appendix J).

Potential economic benefits that would be forgone if the Snapper Mine was not developed would be approximately \$144M (Appendix J).

The Snapper Mine incorporates a range of environmental management and mitigation measures to minimise potential impacts on the environment and the costs of these measures would be met by BEMAX. These costs have been included in the economic assessment, the potential benefits to current and future generations have therefore been calculated in the context of the mitigated Snapper Mine, where environmental impacts have been minimised, where practicable.

Conservation of Biological Diversity and Ecological Integrity

Biological diversity or 'biodiversity' is considered to be the number, relative abundance, and genetic diversity of organisms from all habitats (including terrestrial, marine and other aquatic ecosystems, and the ecological complexes of which they are a part) and includes diversity within species and between species as well as diversity of ecosystems (Lindenmayer & Burgman, 2005). For the purposes of this EA, ecological integrity would be considered in terms of ecological health and ecological values.

The Snapper Mine site has recognised ecological values. Overall, however, the condition of the vegetation in the Snapper Mine area is degraded mainly due to pastoral land management practices (e.g. grazing, thinning and burning), the vegetation is therefore sub-optimal with respect to its flora and fauna components (Appendices D and E).

The environmental assessments described in Sections 4.9 and 4.10 (and Appendices D and E) describe the potential impacts of the Snapper Mine on the biological and ecological environment. In accordance with ESD principles, the Snapper Mine addresses the conservation of biodiversity and ecological integrity by proposing an environmental management framework designed to conserve ecological values where practicable.

Snapper Mine infrastructure would be designed to minimise impacts on the existing environment where practicable. For example, dust controls would be employed to minimise potential impacts on surrounding vegetation. Further details of how the Snapper Mine infrastructure would be designed to minimise impacts on the environment, including potential impacts on threatened species, are provided in Sections 4.9 and 4.10.

Proven operating systems and pollution control structures would be applied where practicable. The potential for environmental degradation would be minimised through training of personnel, environmental auditing and the development of contingency plans in case of an emergency which is likely to impact on the environment. Environmental monitoring would be undertaken to determine whether the environmental control measures are operating effectively. Further details of environmental management and monitoring are provided in Section 4.

The Snapper Mine incorporates a range of environmental management and mitigation measures (including an offset strategy) to address on-site impacts. For example, flora and fauna values in the area would be maintained such that there would be no net loss of flora and fauna values in the area in the medium to long-term. The following components of the Snapper Mine would achieve this:

- impact avoidance and mitigation measures (e.g. minimising disturbance to native vegetation, control of weeds and pests and monitoring);
- progressive rehabilitation and revegetation; and
- the comprehensive Snapper Mine offset strategy.

Further discussion of the compensatory measures is provided in Sections 4.9 and 4.10.

Valuation

One of the common broad underlying goals or concepts of sustainability is economic efficiency, including improved valuation of the environment. Resources should be carefully managed to maximise the welfare of society, both now and for future generations.

In the past, some natural resources have been misconstrued as being free or underpriced, leading to their wasteful use and consequent degradation. Consideration of economic efficiency, with improved valuation of the environment, aims to overcome the underpricing of natural resources and has the effect of integrating economic and environmental considerations in decision making, as required by ESD.

Whilst environmental costs have historically been considered to be external to project development costs, improved valuation and pricing methods attempt to internalise environmental costs and include them within project costing.

The Socio-Economic Assessment (Appendix J) includes an assessment of the economic efficiency of the Snapper Mine and incorporates environmental costs by calculating the net present value (NPV) (i.e. the sum of the discounted benefits less the sum of the discounted costs) as a threshold value. A NPV of \$144M is estimated for the Snapper Mine. This threshold value represents the opportunity cost to society of not proceeding with the Snapper Mine. Interpreted another way, any environmental impacts from the Snapper Mine, after mitigation by BEMAX, would need to be valued at greater than \$144M to make the Snapper Mine undesirable from an economic efficiency perspective.

3.9.4 Summary Consideration of the Potential Impacts and Benefits of the Proposal

An assessment of the potential impacts and benefits of the proposal has been conducted in this EA and associated supporting studies. This section provides a summary conclusion justifying the Snapper Mine, taking into consideration the suitability of the site, potential benefits and potential environmental impacts of the Snapper Mine.

Consideration of Suitability of the Site

The location of the Snapper Mine is determined by the mineral resource and the location of EL 5474 and EL 6024. In addition, the Snapper Mine site would have access to electricity (given the nearby location of the Ginkgo Mine ETL and power supply), main roads and other general services.

The location of the site would also allow BEMAX to utilise its existing MSP in Broken Hill and Ginkgo Mine infrastructure (e.g. the accommodation camp and HAR).

Consideration of Potential Benefits

In accordance with the requirements of the DGRs, a Socio-Economic Assessment has been conducted for the Snapper Mine (Sections 4.13 and 4.14 and Appendix J). The NPV of \$144M for the Snapper Mine represents the opportunity cost to society of not proceeding with the Snapper Mine (Section 3.9.3).

As described in Appendix J, the Snapper Mine would also stimulate regional economic activity during both the construction and operation phases. On average, during the construction phase the Snapper Mine is estimated to contribute:

- \$38M in annual direct and indirect regional output or business turnover;
- \$19M in annual direct and indirect regional value-added;
- \$11M in annual household income; and
- 250 direct and indirect jobs.

The operation of the Snapper Mine is likely to contribute in the order of:

- \$91M in annual direct and indirect regional output or business turnover;
- \$42M in annual direct and indirect regional value-added;
- \$8M in annual household income; and
- 140 direct and indirect jobs.

As described in Appendix J, during Snapper Mine operation there would be an increase in population in the region as people come from outside the region to fill approximately 20% of the operational jobs. For both Broken Hill and Wentworth Shire, the additional population migration associated with the Snapper Mine operation would help offset historic population decline.

The direct and flow-on employment associated with the Snapper Mine operation would result in a requirement for accommodation for people in Broken Hill, Wentworth and Mildura (Section 4.14.2 and Appendix J), therefore increasing the demand for rental housing.

The Snapper Mine would also increase the skills and experience of the Snapper Mine workforce employed from within the region and outside the region. BEMAX have a full-time Training and Development Officer and would continue its Barkindji Education and Employment Program, offer apprenticeships and traineeships and train all officers in Certificate II in Extractive Industry.

Consideration of Potential Environmental Impacts, Mitigation Measures and Environmental Management

The DGRs for the Snapper Mine outline key environmental issues which the Director-General of the DoP has specified must be addressed by this EA. Table 1-3 provides a summary of the DGRs and a reference to the relevant section of this EA where the issues are addressed.

In accordance with the requirements of the DGRs, a General Overview has been conducted for the Snapper Mine (Section 3.8 and Appendix L). The key potential environmental issues identified by the General Overview and the section of this EA where the issues are addressed are detailed in Table 3-1. A summary of environmental issues raised during consultation with government and non-government stakeholders and the sections of this EA where they are addressed is provided in Section 3.7.

As described in Section 3.9.3, the Snapper Mine would be developed and operated in accordance with ESD principles. Section 4 of this EA provides comprehensive consideration of the potential environmental impacts of the Snapper Mine and provides environmental mitigation and management measures for the potential impacts.

A summary of the mitigation measures, environmental management and monitoring programmes is provided in Section 6 (Draft Statement of Commitments).

Conclusion

The proximity of the Snapper Mine to BEMAX's existing Ginkgo Mine would allow for a significant economic advantage to be gained through extensions/sharing of existing Ginkgo Mine infrastructure as well as shared use of the MSP. The Snapper Mine also provides the opportunity to realise significant social and economic benefits, stimulating regional economic activity during both the construction and operation phases.

This EA and associated supporting studies provide a comprehensive consideration of the potential environmental impacts of the Snapper Mine and demonstrate, through the findings and conclusions of the assessments and studies and the Draft Statement of Commitments (Section 6), that BEMAX would mitigate, manage and/or offset the potential environmental impacts of the Snapper Mine.

Given the above, it is considered likely that any residual environmental impacts after mitigation and management would not be valued at higher than the significant benefits of the Snapper Mine. The Snapper Mine is therefore considered to be justified.